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EXAMINER	
FLORES, LEON	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/584,738	KAKURA, YOSHIKAZU	
	Examiner	Art Unit	
	LEON FLORES	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 July 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1137* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,10-19,22-31 and 34-37* is/are rejected.

7)☒ Claim(s) *8,9,20,21,32 and 33* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 July 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims (1-37) have been considered but are moot in view of the new ground(s) of rejection.

Applicant asserts that *"AAPA teaches that a unique hopping pattern is generated for each transmitter (not necessarily for each transmission signal). "A hopping pattern generating portion 84 produces a hopping pattern Shpl unique to the transmitter". Page 3, Nishio simply discloses using a hopping pattern. Nishio does not state that the patterns are different for each signal".*

The examiner respectfully disagrees. AAPA does teach generating a unique hopping pattern for each transmitter, wherein each transmitter generates and transmit a transmission signal. NIshio does suggest that the patterns are different for each signal. (See ¶ 50 "FH sequence selection section selects hopping patterns for the respective subcarrier blocks")

Applicant further asserts that *"the reference does not mention how the system determines large or small. Additionally, the reference does not mention any threshold(s). The claimed invention uses two different thresholds. Accordingly, claims 4-9, 16-21 and 28-33 are patentable over the cited references".*

The examiner respectfully disagrees. Eventhough the reference of Nishio does not explicitly teach or say thresholds, the reference of Nishio does suggest this feature b/c one skilled in the art would know that it would have necessitated to compare the delay variance to some kind of threshold to determine the current status of the channel.

Furthermore, the use of multiple thresholds in order to increase/decrease the number of subcarriers (bit rate) is well known in the art, and it can seen in **US Patent 6,760,596 B1.**

Applicant finally asserts that "While the block size is indirectly related to the number of transmission sequences, the block size is not the same as the number of transmission sequences".

The examiner respectfully disagrees. In Nishio, a block corresponds to N subcarriers. When the channel quality falls below/above a predetermined value the size of the block will be increased/decreased. In other words, the number of subcarriers within a block will be changed wherein suggesting that the number of transmission sequences will eventually change too.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. **Claims (1-3, 10-15, 22-27, 34-37) are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshii Isamu et al (hereinafter Yoshii) (JP2003032226) in view of Applicant's Admitted Prior Art (hereinafter Prior art)**

Re claim 1, Yoshii discloses a wireless communication system using a wireless communication apparatus having a plurality of transmission and reception antennas, wherein: the wireless communication apparatus comprising: correspondence determining means for determining, upon producing first through M-th (M being an integer not smaller than 2) transmission signals, correspondence between first through K-th (K being an integer not smaller than 2) transmission sequences and frequency channels (See fig. 1); and extracting and combining means for extracting and combining, upon producing first through K-th demodulated sequences, M demodulated signals corresponding to the first through the K-th transmission sequences in accordance with the correspondence between the first through the K-th transmission sequences and the frequency channels. (See fig. 2)

But the reference of Yoshii fails to explicitly teach that the correspondence is different for each transmission signal.

However, Prior art does. (See figs. 4-5: ¶s 15 & 18) Prior art discloses that the correspondence is different for each transmission signal. (¶ 15 "hopping pattern generator produces a hopping pattern S_{HP1} unique to the transmitter" & ¶ 18 "hopping pattern generator produces unique hopping patterns S_{HP1} to S_{HPK} corresponding to the transmitters in figure 4")

Therefore, taking the combined teaching of Yoshii and Prior art as a whole, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Yoshii, in the manner as claimed and as taught by Prior art, for the benefit of generating a unique hopping pattern for transmission sequence.

Re claim 2, the combination of Yoshii & Prior art further teach that wherein: the correspondence determining means comprises: a transmitting portion including coded sequence producing means for encoding first through K-th transmission sequences to produce first through K-th coded sequences, respectively (In Prior art, see fig. 4: 81), interleaved sequence producing means for interleaving the first through the K-th coded sequences to produce first through K-th interleaved sequences, respectively(In Prior art, see fig. 4: 82), partial transmission sequence producing means for dividing each of the first through the K-th interleaved sequences into first through M-th partial transmission sequences(In Prior art, see fig. 4: 83), transmission signal producing means for frequency-multiplexing the first through the M-th partial transmission sequences corresponding to each of the first through the K-th transmission sequences with respect to each of the first through the M-th partial transmission sequences to produce first through M-th transmission signals, and first through M-th transmission antennas for transmitting the first through the M-th transmission signals, respectively. (In Prior art, see fig. 4: 93-94)

Re claim 3, the combination of Yoshii & Prior art further teach that wherein:the extracting and combining means comprises a receiving portion including first through N-th (N being an integer not smaller than 1) reception antennas(In Prior art, see fig. 5: 10), demodulating means for decomposing first through N-th reception signals received by the first through the N-th reception antennas into first through M-th partial demodulated signals for each frequency channel(In Prior art, see fig. 5: 110), demodulated sequence producing means for extracting and combining, from the first through the M-th partial demodulated signals for each frequency channel, M demodulated signals corresponding to each of the first through the K-th transmission sequences to thereby produce first through K-th demodulated sequences(In Prior art, see fig. 5: 110), deinterleaved sequence producing means for deinterleaving the first through the K-th demodulated sequences to produce first through K-th deinterleaved sequences, respectively (In Prior art, see fig. 5: 112), and decoding means for decoding the first through the K-th deinterleaved sequences to produce first through K-th decoded sequences, respectively. (In Prior art, see fig. 5: 113)

Re claim 10, the combination of Yoshii & Prior art further teach that wherein OFDM (Orthogonal Frequency Division Multiplex) is used as a wireless transmission method and frequency multiplexing is realized by multiplexing subcarriers. (In Yoshii, see fig. 1)

Re claim 11, the combination of Yoshii & Prior art further teach that wherein: the transmission signal producing means determines, upon producing the first through the M-th transmission signals, correspondence between the first through the K-th transmission sequences and the frequency channels by the use of a different frequency hopping pattern for each transmission signal (In Prior art, see fig. 4: 86); the demodulated sequence producing means extracting and combining, upon producing the first through the K-th demodulated sequences, M demodulated signals corresponding to each of the first through the K-th transmission sequences in accordance with the different hopping pattern for each transmission signal in the transmission signal producing means. (In Prior art, see fig. 5: 107)

Re claim 12, the combination of Yoshii & Prior art further teach that wherein a frequency hopping pattern such that frequency channels corresponding to an i-th (i=1, 2, . . . , K) transmission sequence are completely orthogonal among the first through the M-th transmission signals. (In Prior art, see fig. 4: 86)

Claim 13 has been analyzed and rejected w/r to claim 1 above.

Claim 14 has been analyzed and rejected w/r to claim 2 above.

Claim 15 has been analyzed and rejected w/r to claim 3 above.

Claim 22 has been analyzed and rejected w/r to claim 10 above.

Claim 23 has been analyzed and rejected w/r to claim 11 above.

Claim 24 has been analyzed and rejected w/r to claim 12 above.

Claim 25 has been analyzed and rejected w/r to claim 1 above.

Claim 26 has been analyzed and rejected w/r to claim 2 above.

Claim 27 has been analyzed and rejected w/r to claim 3 above.

Claim 34 has been analyzed and rejected w/r to claim 10 above.

Claim 35 has been analyzed and rejected w/r to claim 11 above.

Claim 36 has been analyzed and rejected w/r to claim 12 above.

Claim 37 has been analyzed and rejected w/r to claim 1 above.

4. **Claims (4-7, 16-19, 28-31) are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshii Isamu et al (hereinafter Yoshii) (JP2003032226) and Applicant's Admitted Prior Art (hereinafter Prior art), as applied to claims 1, 13, 25 & 37 above, and further in view of Akihiko Nishio et al (hereinafter Nishio) (US Publication 2006/0215603 A1)**

Re claim 4, the combination of Yoshii and Prior art fails to teach that wherein the transmitting portion comprises scheduling means for reducing the number of transmission sequences when a reception quality at the receiving portion is lower than a predetermined first threshold and for increasing the number of transmission sequences when the reception quality is higher than a predetermined second threshold.

However, Nishio does. (See fig. 15 & ¶s 99-106) Nishio discloses a FH-OFDM system wherein suggesting that wherein the transmitting portion comprises scheduling means for reducing the number of transmission sequences ("a block corresponds to the number of subcarriers") when a reception quality at the receiving portion is lower than a

predetermined first threshold (“small blocks having a large delay variance" “it would have necessitated to compare the delay variance to some kind of threshold to determine the quality of the channel”) and for increasing the number of transmission sequences when the reception quality is higher than a predetermined second threshold. ("large blocks having a small delay variance" “it would have necessitated to compare the delay variance to some kind of threshold to determine the quality of the channel”) Furthermore, the use of multiple thresholds in order to increase/decrease the number of subcarriers (bit rate) is well known in the art, and it can seen in **US Patent 6,760,596 B1.**

Therefore, taking the combined teaching of Yoshii, Prior art & Nishio as a whole, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Yoshii, as modified by Prior art, in the manner as claimed and as taught by Nishio, for the benefit of controlling the data rate.

Re claim 5, the combination of Yoshii, Prior art & Nishio further teach that wherein the scheduling means reduces the number of transmission sequences successively from the transmission sequence for which the reception quality at the receiving portion for each transmission sequence is low. (In Nishio, see fig. 15 & ¶s 99-106)

Re claim 6, the combination of Yoshii and Prior art fails to teach that wherein the transmitting portion comprises: scheduling means for reducing the number of frequency

channels assigned to the transmission sequences when a reception quality at the receiving portion is lower than a predetermined first threshold and for increasing the number of frequency channels assigned to the transmission sequences when the reception quality is higher than a predetermined second threshold.

However, Nishio does. (See fig. 15 & ¶s 99-106) Nishio discloses a FH-OFDM system wherein suggesting that wherein the transmitting portion comprises: scheduling means for reducing the number of frequency channels assigned to the transmission sequences when a reception quality at the receiving portion is lower than a predetermined first threshold (“small blocks having a large delay variance") and for increasing the number of frequency channels assigned to the transmission sequences when the reception quality is higher than a predetermined second threshold. ("large blocks having a small delay variance")

Therefore, taking the combined teaching of Yoshii, Prior art & Nishio as a whole, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Yoshii, as modified by Prior art, in the manner as claimed and as taught by Nishio, for the benefit of controlling the data rate.

Re claim 7, the combination of Yoshii and Prior art fails to teach that wherein the transmitting portion comprises: scheduling means for reducing the number of frequency channels assigned to the transmission sequence for which a reception quality at the receiving portion for each transmission sequence is lower than a predetermined first threshold and for increasing the number of frequency channels assigned to the

transmission sequence for which the reception quality is higher than a predetermined second threshold.

However, Nishio does. (See fig. 15 & ¶s 99-106) Nishio discloses a FH-OFDM system wherein suggesting that wherein the transmitting portion comprises: scheduling means for reducing the number of frequency channels assigned to the transmission sequence for which a reception quality at the receiving portion for each transmission sequence is lower than a predetermined first threshold (“small blocks having a large delay variance") and for increasing the number of frequency channels assigned to the transmission sequence for which the reception quality is higher than a predetermined second threshold. ("large blocks having a small delay variance")

Therefore, taking the combined teaching of Yoshii, Prior art & Nishio as a whole, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Yoshii, as modified by Prior art, in the manner as claimed and as taught by Nishio, for the benefit of controlling the data rate.

Claims (16-19) have been analyzed and rejected w/r to claims (4-9), respectively.

Claims (28-31) have been analyzed and rejected w/r to claims (4-9), respectively.

5. **Claims (1-7, 10-19, 22-31, 34-37) are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshii Isamu et al (hereinafter Yoshii) (JP2003032226) in view of Akihiko Nishio et al (hereinafter Nishio) (US Publication 2006/0215603 A1)**

Re claim 1, Yoshii discloses a wireless communication system using a wireless communication apparatus having a plurality of transmission and reception antennas, wherein: the wireless communication apparatus comprising: correspondence determining means for determining, upon producing first through M-th (M being an integer not smaller than 2) transmission signals, correspondence between first through K-th (K being an integer not smaller than 2) transmission sequences and frequency channels (See fig. 1); and extracting and combining means for extracting and combining, upon producing first through K-th demodulated sequences, M demodulated signals corresponding to the first through the K-th transmission sequences in accordance with the correspondence between the first through the K-th transmission sequences and the frequency channels. (See fig. 2)

But the reference of Yoshii fails to explicitly teach that the correspondence is different for each transmission signal.

However, Nishio does. (See figs 1 & 9 "Frequency hopping") Nishio discloses a FH-OFDM system wherein suggesting that the correspondence is different for each transmission signal.

Therefore, taking the combined teaching of Yoshii and Prior art as a whole, it would have been obvious to one of ordinary skills in the art to incorporate this feature

into the system of Yoshii, in the manner as claimed and as taught by Prior art, for the benefit of generating a unique hopping pattern for each user.

Re claim 4, the combination of Yoshii and Nishio fails to teach that wherein the transmitting portion comprises scheduling means for reducing the number of transmission sequences when a reception quality at the receiving portion is lower than a predetermined first threshold and for increasing the number of transmission sequences when the reception quality is higher than a predetermined second threshold.

However, the reference of Nishio does suggest that wherein the transmitting portion comprises scheduling means for reducing the number of transmission sequences (“a block corresponds to the number of subcarriers") when a reception quality at the receiving portion is lower than a predetermined first threshold (“small blocks having a large delay variance" “it would have necessitated to compare the delay variance to some kind of threshold to determine the quality of the channel”) and for increasing the number of transmission sequences when the reception quality is higher than a predetermined second threshold. ("large blocks having a small delay variance" “it would have necessitated to compare the delay variance to some kind of threshold to determine the quality of the channel”) Furthermore, the use of multiple thresholds in order to increase/decrease the number of subcarriers (bit rate) is well known in the art, and it can seen in **US Patent 6,760,596 B1.** (See fig. 15 & ¶s 99-106)

Therefore, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Yoshii, as modified by Nishio, in the manner as claimed and as taught by Nishio, for the benefit of controlling the data rate.

Re claim 5, the combination of Yoshii and Nishio further teach that wherein the scheduling means reduces the number of transmission sequences successively from the transmission sequence for which the reception quality at the receiving portion for each transmission sequence is low. (In Nishio, see fig. 15 & ¶s 99-106)

Re claim 6, the combination of Yoshii and Nishio fails to teach that wherein the transmitting portion comprises: scheduling means for reducing the number of frequency channels assigned to the transmission sequences when a reception quality at the receiving portion is lower than a predetermined first threshold and for increasing the number of frequency channels assigned to the transmission sequences when the reception quality is higher than a predetermined second threshold. (See fig. 15 & ¶s 99-106)

Re claim 7, the combination of Yoshii and Nishio fails to teach that wherein the transmitting portion comprises: scheduling means for reducing the number of frequency channels assigned to the transmission sequence for which a reception quality at the receiving portion for each transmission sequence is lower than a predetermined first threshold and for increasing the number of frequency channels assigned to the

transmission sequence for which the reception quality is higher than a predetermined second threshold.

However, the reference of Nishio does suggest that (See fig. 15 & ¶s 99-106) wherein the transmitting portion comprises: scheduling means for reducing the number of frequency channels assigned to the transmission sequence for which a reception quality at the receiving portion for each transmission sequence is lower than a predetermined first threshold (“small blocks having a large delay variance") and for increasing the number of frequency channels assigned to the transmission sequence for which the reception quality is higher than a predetermined second threshold. ("large blocks having a small delay variance")

Therefore, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Yoshii, as modified by Nishio, in the manner as claimed and as taught by Nishio, for the benefit of controlling the data rate.

Claim 13 has been analyzed and rejected w/r to claim 1 above.

Claims (16-19) have been analyzed and rejected w/r to claims (4-9), respectively.

Claim 25 has been analyzed and rejected w/r to claim 1 above.

Claims (28-31) have been analyzed and rejected w/r to claims (4-9), respectively.

Claim 37 has been analyzed and rejected w/r to claim 1 above.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEON FLORES whose telephone number is (571)270-1201. The examiner can normally be reached on Mon-Fri 7-5pm Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. F./
Examiner, Art Unit 2611
October 16, 2009

/David C. Payne/
Supervisory Patent Examiner, Art Unit 2611